

## **ICA11 Cloud Computing Discussion paper and initial analysis**

One of the latest trends of providing IT services directly from the internet or “cloud” is cloud computing. The concept of providing services such as, software, storage, business services, infrastructure, ecommerce, etc., and the incorporation of virtualization as a key component within modern ICT infrastructure has revolutionized the way the global world is doing business and socially interacting.

The ICT Cloud Computing project is designed to incorporate these new technologies and approaches into the ICA11 Training Package. The project will identify any new technological approaches that can be developed into new units and also review current units that can be expanded and updated to incorporate these latest technologies.

### **Cloud Computing Definition**

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams.

A cloud service has three distinct characteristics that differentiate it from traditional hosting.

- It is sold on demand, typically by the minute or the hour;
- it is elastic -- a user can have as much or as little of a service as they want at any given time;
- the service is fully managed by the provider (the consumer needs nothing but a personal computer and Internet access).

Significant innovations in virtualization and distributed computing, as well as improved access to high-speed Internet and the possible cost savings available, have accelerated interest in cloud computing.

A cloud can be private or public. A public cloud sells services to anyone on the Internet. (Currently, Amazon Web Services is the largest public cloud provider.) A private cloud is a proprietary network or a data center that supplies hosted services to a limited number of people. When a service provider uses public cloud resources to create their private cloud, the result is called a virtual private cloud. Private or public, the goal of

cloud computing is to provide easy, scalable access to computing resources and IT services. Cloud services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).

## Summary

ICA11 covers a wide range of units that could possibly be used to support the training in the cloud computing area.

The breakdown is as follows:

- Seven specific units that potentially should refer directly to cloud specific technologies. These would need to be reviewed and updated to mention/include cloud technology concepts ... currently do not mention “cloud”
- A wide range of ICA11 units that while not specifically “cloud focused” could be adapted to incorporate a cloud emphasis or component
- The need for eight(8) new cloud specific units

Note: Cloud computing concepts matrix over the top of current basic networking knowledge and skills ie a trainee/student would need these basic skills prior to undertaking these units of competency. Would be most suitable as a skills set available at the relevant Level

Cloud Computing Concepts	Possible Vendor Linkages (Needs to be further clarified)	Relevant ICA11 Units	Possible New Units Required
<b>Cloud Fundamentals</b> <ul style="list-style-type: none"> <li>• Historical background to the move to Cloud Computing</li> <li>• Terminology and Concepts</li> <li>• Cloud characteristics</li> <li>• Public and Private clouds</li> <li>• Basics of Virtualisation</li> <li>• Benefits and Risks</li> <li>• Basic Software (SaaS), Platform (PaaS) and Infrastructure (IaaS)</li> </ul>	CompTIA Cloud Essentials  Microsoft – MS Office 365 to build on current IT Administrator skills and move from on-premise deployment to public cloud model  VMWare vSphere Fundamentals	Prerequisite = Core networking knowledge @ Certificate 3/4 Level	<i>Level 3/Level 4/Level 5??</i>  <i>New Unit – Cloud Computing Fundamentals</i>  <i>New Unit – Basic Cloud Computing Concepts</i>

concepts			
<p><b>Understanding Cloud Technologies</b></p> <ul style="list-style-type: none"> <li>• Cloud computing mechanisms</li> <li>• Different cloud types</li> <li>• Cloud balancing</li> <li>• Common risks and threats</li> <li>• Cloud based security</li> <li>• Cloud storage options</li> <li>• Performance testing</li> <li>• Impact on IT Service Management</li> <li>• Building cloud platforms (SaaS, PaaS, IaaS)</li> <li>• Cloud computing deployment</li> <li>• Emerging trends</li> </ul> <p><b>Cloud Architecture</b></p> <ul style="list-style-type: none"> <li>• Possible cloud platforms and solutions</li> <li>• Different platforms advantages/disadvantages</li> <li>• Technical requirements</li> <li>• Implementation strategies</li> <li>• Possible hybrid solutions</li> </ul> <p><b>Cloud Security</b></p> <ul style="list-style-type: none"> <li>• Common Risks, Threats and Vulnerabilities</li> <li>• Cloud security mechanisms</li> </ul>	<p>CompTIA Cloud Essentials</p> <p>Microsoft - Implementing &amp; managing MS Server virtualisation – Windows Server 2008 R2 &amp; Hyper V</p> <p>Server Virtualisation Microsoft – Private Cloud monitoring &amp; operations with System Centre 2012</p> <p>Server Virtualisation Microsoft – Private Cloud configuration &amp; deployment with System Centre 2012</p> <p>VMWare – Install, configure Manage</p> <p>VMWare vCentre Lab manager fundamentals</p> <p>VMWare ESXi Administration</p> <p>VMWare vSphere Troubleshooting &amp; Manage</p>	<p>Prerequisite = Core networking knowledge @ Certificate 4/5 Level</p> <ul style="list-style-type: none"> <li>• ICANWK526A Install an enterprise virtual computing environment</li> <li>• ICANWK525A Configure an enterprise virtual computing environment</li> <li>• ICANWK527A Manage an enterprise virtual computing environment</li> <li>• ICANWK416A Build security into virtual private networks</li> </ul>	<p><b><i>Level 4/Level 5/Level 6??</i></b></p> <p><b><i>Update Four Units(or write extra new ones)</i></b> Need to review these units and ensure that they cover the industry standards for virtualisation (ie Microsoft, VMWare, Citrix) and also refer to where possible Cloud computing implementations. They should include cloud focused administration, management and troubleshooting</p> <p><b><i>New Unit – Cloud Computing Technologies</i></b></p> <p><b><i>New Unit – Building Cloud Platforms</i></b></p> <p><b><i>New Unit – Analysing different cloud platforms</i></b></p> <p><b><i>New Unit – Security implications for cloud computing</i></b></p>

<ul style="list-style-type: none"> <li>• Cloud-Based Security Groups</li> <li>• Security design patterns and controls</li> </ul>	<p>for performance</p> <p>VMWare vCentre Capacity IQ Fundamentals &amp; vCentre AppSpeed</p> <p>VMWare VSphere Manage &amp; design for security</p> <p>Citrix XenServer Possible areas to consider;</p> <ul style="list-style-type: none"> <li>• Citrix Certified Administrator (CCA)</li> <li>• Citrix Certified Advanced Administrator (CCAA)</li> <li>• Citrix Certified Enterprise Engineer (CCEE) for Virtualisation</li> </ul>		
<p><b>Cloud Storage</b></p> <ul style="list-style-type: none"> <li>• Storage devices</li> <li>• Relation, non-relational structures and storage patterns</li> <li>• Implementation technologies</li> </ul>	<p>Microsoft – moving from a Data Administrator to a data steward in a cloud environment using Microsoft</p>	<ul style="list-style-type: none"> <li>• ICADBS503A Create a data warehouse</li> <li>• ICADBS601A Build a data warehouse</li> </ul>	<p><b><i>Update Three Units(or write extra new ones)</i></b></p> <p>Need to review these units and ensure that the data warehouse</p>

<ul style="list-style-type: none"> <li>Storage concepts such as persistent storage, redundant storage, cloud attached/remote storage and cloud storage gateways</li> </ul>	<p>SQL Azure cloud based relational databases</p> <p>Microsoft – becoming a cloud developer understanding how applications are designed, developed and deployed for PaaS – using Azure, Visual Studio and SQL Server</p>	<ul style="list-style-type: none"> <li>ICAPRG603A Create cloud computing services</li> </ul>	<p>component incorporates cloud storage options. They should include cloud focused structures and storage concepts</p> <p><i><b>New Unit – Cloud storage concepts</b></i></p> <p><i><b>New Unit – Cloud storage technologies</b></i></p> <p><i><b>Note: would not envisage developing the programming/scripting side but concentrate more on the technical storage concepts</b></i></p>
<p><b>Cloud Governance</b></p> <ul style="list-style-type: none"> <li>Cloud governance building blocks</li> <li>Understanding precepts, roles, practices, processes</li> <li>Using basic cloud governance technologies</li> <li>Understanding and establishing regulatory controls</li> </ul>	<p>High Level Analysis Required</p>		<p>Recommend not developing - More suited to University qualifications</p>